Region 10
United States Environmental
Protection Agency

DRAFT
UPPER COLUMBIA RIVER SITE
RI/FS SCOPING PLAN

August 11, 2004

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Contents

Acronyms

ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	chemicals of concern
COPCs	chemicals of potential concern
CSM	conceptual site model
DQOs	data quality objectives
EPA	U.S. Environmental Protection Agency
EPCs	exposure point concentrations
ERA	ecological risk assessment
FSP	field sampling plan
GIS	geographic information system
GRAs	general response actions
HHRA	human health risk assessment
HSP	health and safety plan
IDW	investigation-derived waste
OSWER	Office of Solid Waste and Emergency Response
PCBs	polychlorinated biophenyls
PCSM	preliminary conceptual site model
PRGs	preliminary remediation goals
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RAAs	response action alternatives
RAOs	remedial action objectives
RI/FS	Remedial Investigation and Feasibility Study
ROD	record of decision
RPM	remedial project manager
SAP	sampling and analysis plan
SM	site manager
UCR	Upper Columbia River
USGS	U.S. Geological Survey

SECTION 1

Introduction

This document presents a scoping plan for the completion of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigation and Feasibility Study (RI/FS) for the Upper Columbia River (UCR) in Washington State. The activities and approach described in this scoping plan will be executed by the U.S. Environmental Protection Agency (EPA) and its contractor, CH2M HILL. EPA's guidance document, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA," dated October 1988, describes development of RI/FS work plans and the RI/FS process to be followed. This scoping document will serve as a "road map" for the RI/FS process.

Previous investigations by federal and state agencies have identified the presence of contamination within the U.S. portion of the UCR and surrounding upland areas from the Grand Coulee Dam to the Canadian border. Other previous studies evaluated contaminant source areas and effects north of the Canadian border. Contaminants found by those studies include heavy metals such as cadmium, copper, lead, mercury, and zinc, as well as organic contaminants such as dioxins, furans, and polychlorinated biphenyls (PCBs). Figure 1 presents a map of the Upper Columbia River and vicinity.

In August 1999, the Colville Confederated Tribes petitioned EPA to conduct an assessment of the UCR. The petition expressed concerns about risks to people's health and the environment from contamination in the river. In December 2000, EPA completed a preliminary assessment (EPA, 2000c), which indicated that further data collection was warranted. In 2001, EPA conducted an expanded site inspection and collected sediment samples to learn more about the types and amounts of pollution present (EPA, March 2003). The results showed that contamination was present and that an RI/FS was warranted.

1.1 Purpose and Objective

The overall objective of the UCR RI/FS process is to gather sufficient information to support an informed risk management decision regarding the location of site boundaries and whether remediation is needed, and which remedies appears to be most appropriate. The RI/FS also will characterize the site, establish recommended site boundaries, and evaluate a remedy that is protective of human and ecological receptors. The appropriate level of analysis to meet these objectives will be reached through careful planning concerning the essential data that are needed to support risk assessment and remedy selection decisions.

The purpose of the UCR RI/FS is to:

1. Evaluate how much contamination exists and where it is located (from the international border to the Grand Coulee Dam and surrounding upland areas)
2. Determine if people's health or the environment are at risk from the contamination
3. Determine if cleanup is needed
4. Develop and evaluate cleanup options

Risk assessment plays a central role in the site characterization and potential cleanup associated with any RI/FS project. The purpose of a risk assessment is to characterize the risks posed by hazardous substances. This information is required to make risk management decisions related to the site. The results of the risk assessment are used to identify media requiring remediation and to establish cleanup goals, as appropriate. The approach to be used for the risk assessment and other tasks necessary to complete the RI/FS is described in this scoping plan.

1.2 RI/FS Approach

The UCR RI/FS technical approach follows that described by EPA guidance documents. A flow chart depicting the generalized RI/FS process is shown in Figure 2. A more detailed depiction of the anticipated work elements and tasks to be completed for the UCR RI/FS is shown in Figure 3. The site characterization work will address a variety of environmental media where chemical impacts may be present; however, it is anticipated that sediment in the Columbia River will be a primary media of interest for this site. Key concepts from sediment-related guidance documents such as the recent EPA memorandum, "Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites" [Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-08 (EPA, 2002) have been considered in the development of this scoping plan.

The RI process is both iterative and sequential. Completion of the RI/FS for the UCR site is anticipated to be a multiyear program involving several phases of data gathering and data evaluation as chemical distributions and the factors driving risks to ecological receptors and human health are identified. A phased approach is necessary and appropriate given the size of the UCR site, the complexity of contaminant fate and transport controls, the types of potential human health and ecological exposure scenarios to be evaluated, and the range of management goals represented by the state, tribes, other federal agencies, and interested parties. Use of a phased approach will help to make the level of effort commensurate with the needs of the specific risk management decisions at issue. Achieving an appropriate level of effort involves using simple but conservative early assessments to evaluate and screen pathways, media, chemicals, and areas that are of greatest concern.

Two concepts are essential to the phased UCR RI/FS. First, existing data will be gathered and reviewed to obtain a preliminary understanding of past and current site conditions. Subsequent data collection efforts are expected to involve multiple phases of data gathering and data evaluation over several field seasons. Initial RI data collection efforts will focus on developing an improved understanding of site conditions, with subsequent data collection efforts focused on filling identified gaps and gathering information necessary to evaluate risk and develop and evaluate remedial alternatives.

A second important concept is that the phased approach encourages identification of key data needs as early in the process as possible to ensure that data collection is always directed toward providing information to determine if action is required, and if so developing data relevant to selection of a remedial action. In this way the overall site characterization effort can be scoped and directed to minimize the collection of unnecessary data and maximize data quality and usefulness.

A sufficient number of data collection and evaluation phases will be conducted to define source areas of contamination, the potential pathways of migration, and the potential receptors and associated exposure pathways to the extent necessary to:

- Determine whether, or to what extent, a threat to human health or the environment exists
- Develop and evaluate remedial alternatives
- Support future enforcement or cost-recovery activities

1.3 RI/FS Tasks

The work elements used to conduct the phased UCR RI/FS are broken into a number of tasks. These tasks are:

- Task 1—Project Planning
- Task 2—Community Relations
- Task 3—Field Investigation/Data Acquisition
- Task 4—Sample Management, Analysis, and Validation
- Task 5—Data Evaluation
- Task 6—Risk Assessment
- Task 7—Treatability Studies
- Task 8—RI Reports
- Task 9—Development and Screening of Remedial Alternatives
- Task 10—Detailed Analysis of Alternatives
- Task 11—Feasibility Study Report

The overall progression of work under this RI/FS process is shown in Figure 2, and is broken into major work elements (boxes). Figure 3 shows the relationship between the tasks and the major work elements. *RI/FS Scoping* consists of work activities conducted prior to gathering additional site characterization data, incorporates information from previous studies, and enhances the scoping of subsequent RI activities. *Community Relations* activities occur throughout the RI/FS, and are conducted as Task 2. The *Remedial Investigation* activities include site characterization (Tasks 3 through 8) and treatability investigations (Task 7). The *Feasibility Study* activities include development and screening of remedial alternatives (Task 9), and detailed analysis of alternatives (Task 10) and FS reporting (Task 11). The arrows between the RI and FS boxes depict the phased and interactive process for gathering, assessing, and using study information. The findings of the RI/FS will be used by decision-makers to select a preferred remedy for public comment. After consideration of public input, the decision-makers select a final remedy and issue a record of decision (ROD).

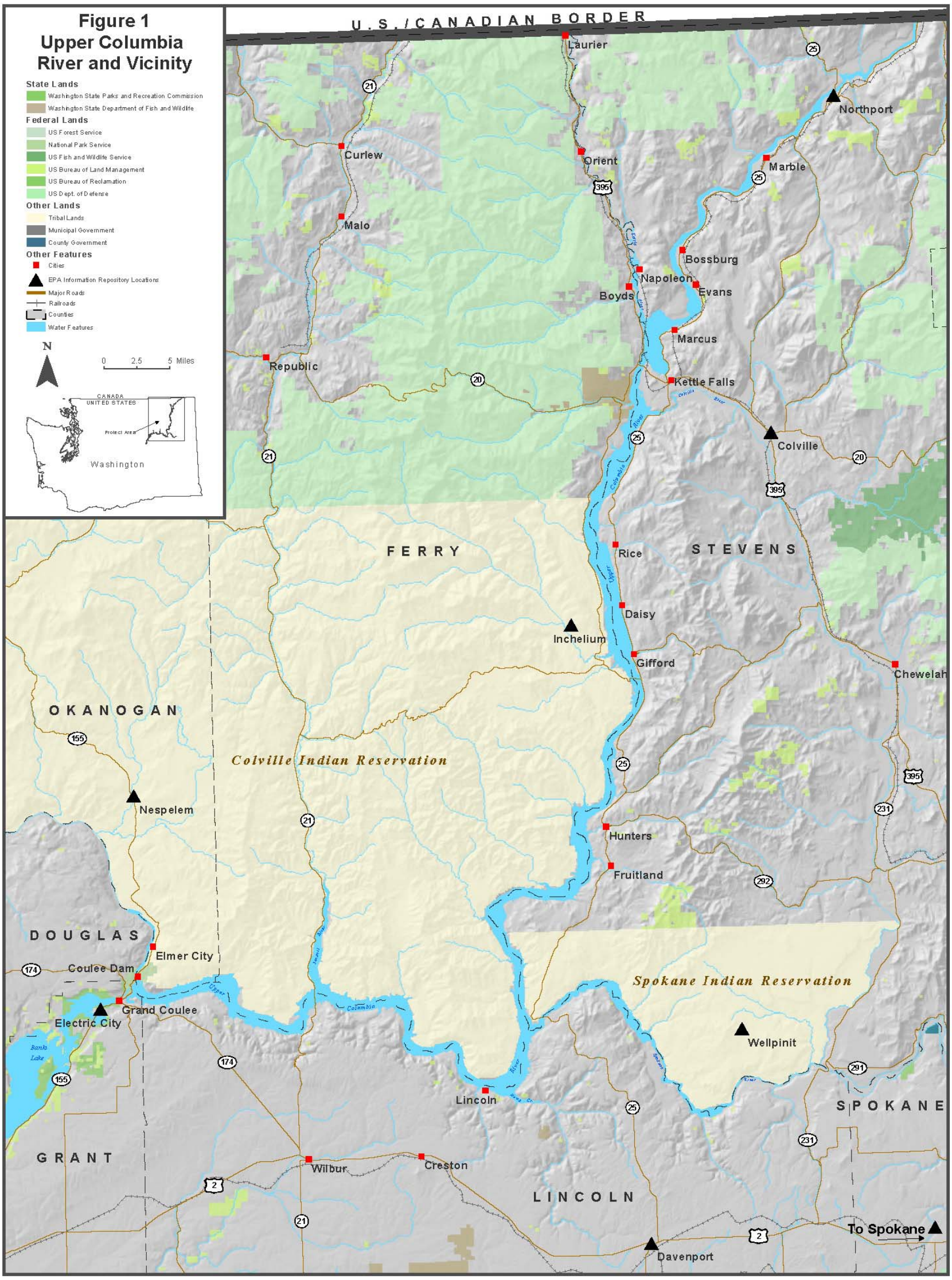
1.4 Document Organization

This scoping plan is organized in the following sections, which match the major project work elements described in Section 1.3 and depicted in Figure 3:

- Section 1: Introduction

- Section 2: RI/FS Scoping
- Section 3: Remedial Investigation
- Section 4: Feasibility Study
- Section 5: References

Figure 1
Upper Columbia River and Vicinity



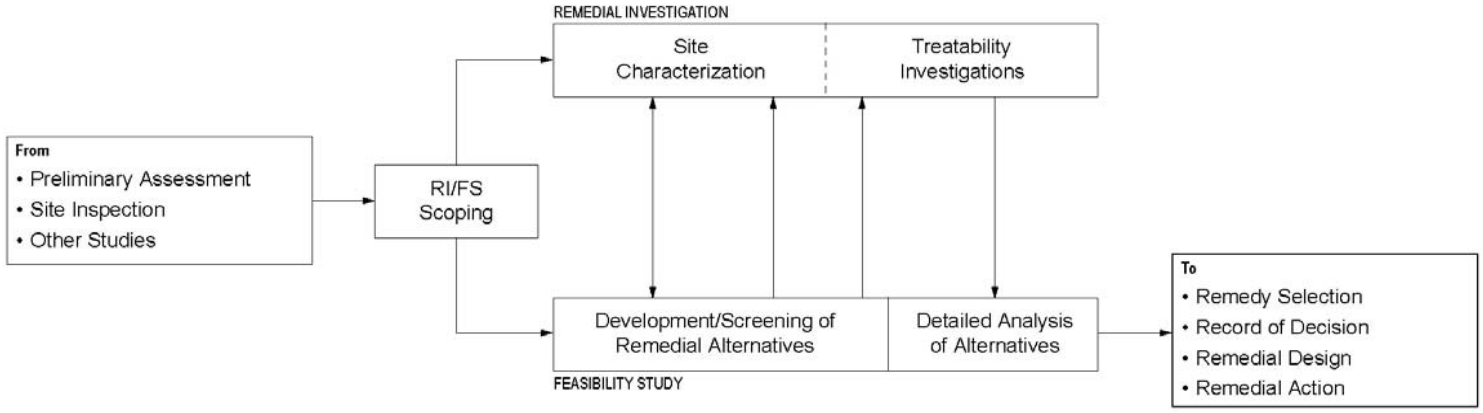


Figure 2.
Generalized RI/FS Process
Upper Columbia River RI/FS Scoping Plan

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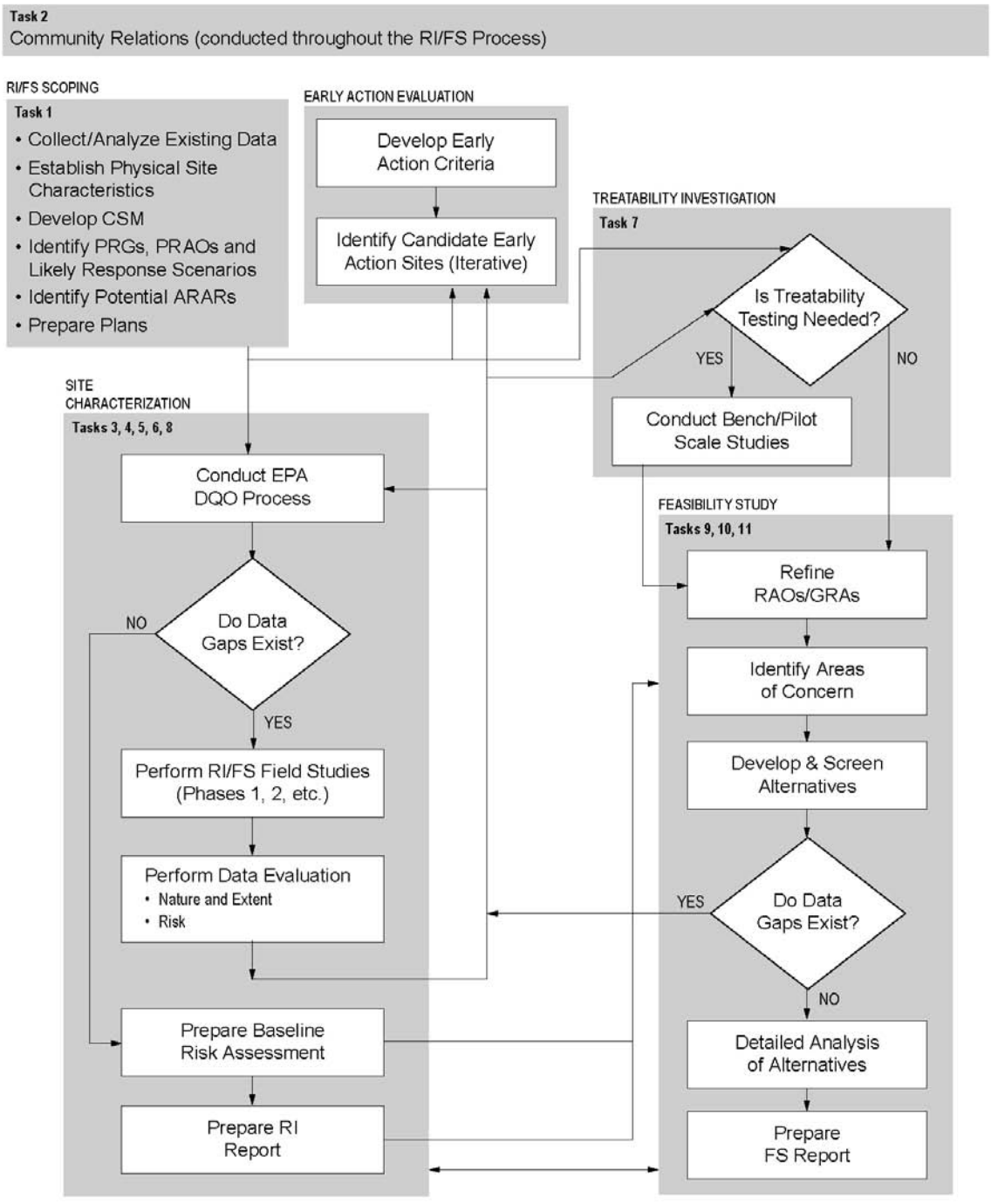

Figure 3.
Relationship of RI/FS Work Plan
Tasks to Phased RI/FS Approach
Upper Columbia River RI/FS Scoping Plan

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SECTION 2

RI/FS Scoping

The purpose of RI/FS scoping is to use existing information to develop an initial understanding of site conditions and potential cleanup objectives. The RI/FS scoping process will rely on a large body of existing information to establish the physical characteristics of the site and to support development of a preliminary conceptual site model (PCSM). The PCSM, in turn, will provide the technical basis for identifying data needs, determining data gaps, and developing data quality objectives (DQOs) for the initial phase(s) of RI/FS data collection. During the scoping phase, the EPA will solicit participation and input from the state, tribes, other federal agencies, and interested parties.

RI/FS scoping will be conducted using the following five subtasks:

- Subtask 1.1—Collect and Analyze Existing Data and Information
- Subtask 1.2—Establish Physical Characteristics of the Site
- Subtask 1.3—Develop a Conceptual Site Model
- Subtask 1.4—Identify Preliminary Remediation Goals, Remedial Action Objectives, and Response Action Alternatives
- Subtask 1.5—Identify Potential Applicable or Relevant and Appropriate Requirements

2.1 Project Planning (Task 1)

2.1.1 Collect and Analyze Existing Data and Information (Subtask 1.1)

The purpose of this subtask is to collect and analyze existing data and information that are pertinent to the RI/FS. This information will be used to help determine the additional work that needs to be conducted during forthcoming phases of investigation. A review of the existing literature will be conducted to understand the scope and location of previous investigation efforts within the UCR study area. Evaluation of the existing information will facilitate identification of the questions that need to be answered during the RI/FS. These efforts are intended to help focus and direct subsequent RI sampling and analysis efforts, resulting in a more efficient expenditure of resources. Efforts to collect and analyze historical data and information are ongoing and will continue throughout the RI and FS. To date, over 400 documents and data sets representing a variety of topics and studies that are potentially pertinent to the UCR RI/FS process have been compiled. This information will be used to develop an initial understanding of the physical, chemical, and biological processes at the site and to assist in the development of the conceptual site model and identification of data gaps.

The analysis of existing data serves to provide a better understanding of the nature and extent of contamination and aids in the design of remedial investigation tasks. If quality assurance information on existing sampling data is available, it will be reviewed to assess the level of uncertainty associated with the data. This is important to establish whether sampling will be needed to verify or simply supplement existing data. Some of the principal issues related to the usability of historical data include:

- Data quality
- Expected changes in chemical of concern (COC) concentrations in various environmental media as a result of changes in anthropogenic activities over time (e.g., reduction/elimination of known source discharges to the Columbia River, or to the atmosphere)
- Intended use of the data

Other important factors to be considered when reviewing existing data are the comparability of the data (e.g., time of sampling, including year and season), the analytical methods, the detection limits, the analytical laboratories, and the sample collection and handling methods.

Approach

Collection of historic data contained in the existing literature will be conducted in a systematic fashion as follows:

1. Available bibliographic databases will be reviewed and queried as appropriate to identify their possible relevance to completing the RI/FS. Requests for documents and environmental data will then be made.
2. Documents will be assigned a unique project document control number and general document information will be entered into a document control database. In this case, general document information includes document title, author(s), date of publication, and key words.
3. Pertinent documents will be reviewed by technical leads. The technical leads will generate a brief synopsis of their observations regarding the content of the document and applicability to the various elements of the RI/FS from their unique perspective. Pertinent documents will be converted to electronic format (.pdf) and made available to the project team via an internet searchable document database.
4. Environmental data sets will receive an initial quality assessment and will be flagged with an assessment code. The purpose of the code is to provide users of the data with a general understanding of overall data quality. Individual data sets or data points may receive a more thorough quality assessment based on intended data use.
5. Historical chemical data of suitable quality for project scoping and conceptual site model (CSM) development will be compiled in an internet-accessible relational database for easy retrieval, summarization, or transfer to geographic information systems and other software.
6. Once a reliable initial database has been established, these data will be further evaluated to identify their representativeness for risk assessment or other RI uses. An evaluation of spatial, temporal, chemical, and exposure representativeness will be conducted to identify where data gaps exist that need to be addressed during the RI.

Using GIS as an Analytical and Interpretive Tool

Given the large size of the UCR site, the geographic information system (GIS) will be used for relating data to its location. GIS can also be used as a tool for a variety of other applications. For example, exceedance data on human health and ecological preliminary remediation goals (PRGs) can be mapped to identify areas of unacceptable risk and focus the development of response-action alternatives. Similarly, GIS can be used to map and measure individual project areas to help establish sampling plans, and to facilitate communication of proposed sampling locations for review of potential cultural sensitivities.

Creation of GIS Data Layers

GIS data layers will be created to help interpret and understand the very large site, and display areas of human and ecological significance that are pertinent to this study. These layers can be overlain on maps and figures for graphical presentation. Examples of data layers are human use areas, areas of known cultural or historical significance, wildlife habitats, ecosystem types, sample results, and pertinent fisheries information.

Development of Project Web Site

A project web site will be created to share the electronic data and document databases. It will also contain a shared project schedule and contact list, to help coordinate development and distribution of deliverables and project communication. The project web site is expected to be dynamic through time as it adapts to the varying requirements of the different phases of the RI/FS process. The web site will have restricted access, requiring both user identification and password. It is expected that access to the site, or portions of the site, will be expanded.

2.1.2 Establish Physical Characteristics of the Site (Subtask 1.2)

The purpose of this subtask is to describe the physical characteristic of the UCR site. Existing data and literature information will be used to develop a site description that will include:

- Physiography and Topography
- Climate and Meteorology
- Geology and Soils
- Hydrogeology
- Upper Columbia River Hydrology (Columbia River and Tributaries)
- Grand Coulee Dam Operations and Reservoir Characteristics
- Bathymetry
- Physical Characteristics of Sediments
- Sediment Transport and Transport Regimes
- Ecological Setting (Vegetation; Aquatic Biota; Wildlife; Rare, Threatened, or Endangered Species)
- Historical and Current Land Use
- Cultural Resources

This information will provide a framework for development of the CSM.

2.1.3 Develop a Conceptual Site Model (Subtask 1.3)

Under this subtask a preliminary CSM will be developed based on the current understanding of the UCR study area. The CSM will be formulated according to guidance based on professional judgment and information on chemical sources, release mechanisms, physical processes, routes of migration, the nature and extent of contamination, fate and transport processes, potential exposure points, potential routes of exposure, and potential population groups associated with the UCR site. As additional site information is generated throughout the phased RI process, the CSM will be revised as appropriate (e.g., potential migration pathways eliminated or added, accordingly). Graphical approaches will be used to the extent possible to depict the current understanding of site conditions and inter-relationships among the components of the CSM.

Potential Primary Constituent Sources

Historical and ongoing primary sources of potential contamination to the UCR site will be summarized. Initial release points of contamination are defined herein as *primary sources*.

Potential primary sources to be summarized include:

- Teck Cominco smelting and other industrial operations
- Le Roi Smelter (Northport)
- Celgar pulp and paper operations
- Municipal (e.g., landfills and wastewater treatment discharges)
- Mining (historic mine and mill sites)
- Agricultural/forestry
- Railroad operations
- Reservoir bank slumping
- Industrial point source discharges

Potential Secondary Constituent Sources

This part of the CSM will summarize historical and ongoing secondary sources of potential contamination to the UCR site. Media or receptors that have been affected by primary sources, and which could cause subsequent release and/or exposure, are defined herein as *secondary sources*.

Potential secondary sources to be summarized include:

- Smelter slag/contaminated sediment present in the floodplain north of the international border
- Fish and shellfish
- Sediment
- Soil
- Dust from beaches or soil
- Vegetation
- Livestock
- Game animals
- Groundwater
- Tributary inflow
- Suspected mercury pools

Release Mechanisms and Contaminant Migration Pathways

Release mechanisms and contaminant migration pathways will be described for primary and secondary sources. The release mechanisms and migration pathways to be included are:

- Industrial discharges/disposal to water, air, or land
- Municipal discharges/disposal to water, air, or land
- Dissolution/leaching of secondary sources
- Atmospheric deposition
- Upstream inflow
- Hydraulic transport
- Resuspension and subsequent hydraulic transport
- Resuspension and atmospheric transport
- Chemical precipitation
- Sedimentation
- Erosion
- Bio-uptake into plants and animals

Preliminary Exposure Pathways

This section of the CSM will address potential contaminant exposure pathways for human and ecological receptors. Primary potential pathways likely will include:

- Fish and shellfish consumption by people and animals
- Direct contact with sediment and surface water by beach and river/reservoir users
- Inhalation of dust from primary or secondary sources
- Bioaccumulation of constituents through the food web
- Direct exposure of wildlife, fish, and invertebrates to sediments/pore water and surface water constituents
- Human consumption of surface water
- Consumption of livestock, game, crops, and native plants affected by site constituents

Identification of Non-Contaminant Ecological Stressors

Any physical, chemical, or biological entity that can elicit an adverse ecological response at the site is known as a *stressor*. Although chemical impacts will be the primary focus of the ecological risk assessment (ERA), there may be biological disturbances that result from non-contaminant stressors, such as seasonal reservoir fluctuations, hatcheries, recreational use, flood events, invasive species, etc. While these non-contaminant ecological stressors are not the primary focus of the ERA, their effects can sometimes be misconstrued as possible chemical effects. Consequently, where possible, these non-contaminant factors will be accounted for in interpreting habitat and ecosystem changes.

Preliminary Nature and Extent of Contamination

The preliminary CSM will describe the apparent nature and extent of contamination based on an initial review of existing data from many sources. Graphical and map-based representations of chemical constituent concentrations will be prepared for selected chemicals of potential concern (COPCs) in several environmental media. Data permitting, the nature and extent of contamination will be assessed for the following media:

- Air
- Soil
- Groundwater
- Surface water
- Sediment
- Sediment pore water
- Biota

As the RI progresses and additional chemical concentration data become available, the description and depiction of the nature and extent of contamination will be periodically revised and updated.

2.1.4 Identify Preliminary Remediation Goals, Remedial Action Objectives, and Response Action Alternatives (Subtask 1.4)

Under this subtask, preliminary remediation goals (PRGs), preliminary remedial action objectives (RAOs), and likely response scenarios (i.e., remedial action alternatives) will be identified. The purpose of this process is to provide a framework for assessment of data gaps and subsequent data gathering, compilation, and assessment.

Preliminary Remediation Goals

PRGs are risk-based concentrations intended to assist in initial screening-level evaluations of environmental measurements. The PRGs are generic; they are calculated without site-specific information. However, they can be re-calculated based on site-specific data. PRGs may vary for different site uses and exposure factors. The PRGs will be used as guidelines for site "screening" and as initial cleanup goals, if applicable. PRGs are not de facto cleanup standards. However, they are helpful in providing long-term targets to use during the analysis of different remedial alternatives. By developing PRGs early in the decision-making process, consideration of remedial alternatives can be streamlined.

Preliminary Remedial Action Objectives

Preliminary RAOs will be developed as part of subtask 1.4. RAOs are statements that provide a description of what a remedial action is designed to accomplish. RAOs reflect the COCs, exposure routes and receptors, and acceptable contaminant concentrations (or range of acceptable contaminant concentrations) for each medium of concern. RAOs may be divided by medium or geographic area. The preliminary RAOs will be refined throughout the data collection and evaluation phases of the RI/FS.

Develop Preliminary Response Action Alternatives

Preliminary response action alternatives (RAAs) will be identified. This is a preliminary step in the scoping phase of the RI/FS and is not meant to provide detailed development and evaluation of alternatives. Instead, the identification of preliminary RAAs is intended to be a more general classification of potential response actions based on the initially identified potential routes of exposure and associated receptors. The identification of potential technologies at this stage will help ensure that data needed to evaluate them can be collected as early as possible. Early identification will also help determine the need for treatability studies.

A preliminary list of broadly defined alternatives will be developed by identifying general response actions (GRAs) for each medium. These general response actions will satisfy the preliminary RAOs and include such actions as source control, treatment, containment, removal, enhanced natural recovery, and institutional actions. Once the general response actions have been defined, the technology types and process options to implement them can be defined. Technology types are categories of technologies such as chemical treatment, immobilization, capping or dewatering. Process options refer to specific processes within each technology type.

The preliminary RAAs developed will reflect the goal of presenting a range of distinct, viable remedial options and will therefore include a range of alternatives that may include:

- One or more alternatives in which treatment that significantly reduces the toxicity, mobility, or volume of waste is a principal element
- One or more alternatives that involve containment with little or no treatment
- A no-action alternative

Various methods will be used to identify the general response actions, technology types, and process options for each medium. These methods include previous experience at similar sites, literature searches, Internet searches to identify related web sites, and technology database searches. During this preliminary phase the emphasis will be on identifying technologies and process options that have significant potential for being implemented at the UCR site, not on ensuring that an all-inclusive list is generated.

Potential Early Actions

Early actions are conducted to remove, control, or reduce areas of potential risk via an accelerated cleanup process. The potential need for early actions and the technical and cultural considerations affecting the implementation of early actions will be assessed.

2.1.5 Identify Potential ARARs (Subtask 1.5)

CERCLA requires that Superfund remedial actions meet federal standards, requirements, criteria, or limitations that are determined to be applicable or relevant and appropriate requirements (ARARs) legally. State, tribal, or local requirements must also be met where applicable if they are more stringent than the corresponding federal requirements.

There are three types of ARARs: chemical-, location-, and action-specific. Chemically specific ARARS are laws and regulations that identify health- or risk-based concentration limits for specific hazardous substances. These requirements will be considered in the evaluation of cleanup levels for this project. Location-specific ARARs are requirements that relate to the geographical or physical position of the site, rather than the nature of the contaminants or the actions at the site. These requirements address the type of action that can be implemented. Action-specific ARARs are requirements that define acceptable containment, treatment, storage and disposal criteria and procedures. These ARARs generally set performance, design, or other similar action-specific controls or restrictions on particular kinds of activities related to management of hazardous substances. In general, chemical- and location-specific ARARs provide the basis for determining the objectives and goals of remedial action, whereas the action-specific ARARs provide the basis for determining how the remedial action will be carried out.

A summary of preliminary chemical-, action-, and location-specific relevant regulations and requirements at the federal, tribal, state and local level will be developed. These ARARs will serve as a starting point as potential ARARs are evaluated more closely in the detailed analysis of alternatives as part of the FS.

2.2 Community Relations (Task 2)

It is EPA policy that a community relations effort must accompany any CERCLA remedial investigation and response. Elements of the community relations process for this project will include:

- Completion and documentation of community interviews
- Preparation of a community involvement plan
- Establishment of an information repository and administrative record
- Preparation of routine public notices
- Solicitation of public comment and preparation of comment responses
- Solicitation and consideration of community and management values for the UCR

The large size and cultural/demographic diversity within the UCR project area, and the complexity of the various contamination source, fate, and transport issues associated with the site are important issues that will be considered when developing and implementing the community relations process for this project.

2.2.1 Community and Management Goals

As part of the community relations process, current and reasonably anticipated future beneficial uses of the UCR project area will be identified. Early identification of these beneficial uses by project decision-makers will help form discussion topics for subsequent community, landowner, and other interested party meetings.

SECTION 3

Site Characterization

3.1 Field Investigation/Data Acquisition (Task 3)

3.1.1 General Approach

A large body of environmental data has been generated to date on a variety of topics and conditions pertinent to the current UCR remedial investigation. Section 2.1.1 describes the process that will be used to collect, analyze, and categorize these various sources of information. These data will serve as a basis for establishing a preliminary CSM, which in turn will support the development of DQOs. Field investigations conducted as part of the UCR RI will involve a variety of field sampling and data collection activities. These activities are intended to address specific data needs and fill critical data gaps in the preliminary CSM. These field investigation tasks will be detailed in a FSP that will be prepared prior to execution of the RI field tasks. The main objective of these field investigation efforts is to obtain sufficient information to assess sitewide risk and understand the distribution of chemical constituents sufficient to support the development of the RI and baseline risk assessment reports.

A phased, or iterative, approach will be used for conducting field investigations. The approach will be to make the level of effort commensurate with the needs of the specific risk management decisions at issue. Achieving an appropriate level of effort involves using simple but conservative early assessments to evaluate and screen pathways, media, chemicals, and areas that are of greatest concern. Those that are not retained after the initial screen will be identified as of low concern, and their uncertainties addressed during the risk characterization phase. Those that are not demonstrated to be insignificant on the basis of this initial screen will be subjected to more realistic and rigorous evaluations (for instance, more site-specific exposure assumptions) that are intended to characterize risk more realistically and avoid unnecessary remedial action. This overall strategy is designed to focus resources where they are most needed for decision-making purposes.

It is expected that several environmental media will be sampled as part of the RI field efforts, including:

- Air
- Soil
- Groundwater
- Surface water
- Sediment (submerged and exposed)
- Sediment pore water
- Biota

Media-specific field investigations will be conducted to assess both spatial and temporal variations in contaminant concentrations. Existing information on background contaminant

concentrations will be identified, if available, and additional sampling to further develop background concentrations will be considered based on the quality, quantity, and applicability of the existing data sets.

3.1.2 Data Needs and Data Quality Objectives

Identification of data needs is an important part of the RI/FS scoping process. Data needs are identified by evaluating the existing data and determining what additional data are necessary to characterize the site (e.g., determine the nature and extent of contamination and determine the fate and transport mechanisms), develop a better conceptual understanding of the site, better define the ARARs, narrow the range of remedial alternatives that have been identified, and support enforcement activities. The need for additional site data is evaluated relative to meeting the site-specific RI/FS objectives. If additional data are needed, the intended uses of the data are identified, strategies for sampling and analyses are developed, DQOs are established, and priorities are assigned according to the importance of the data in meeting the objectives of the RI/FS.

Development of DQOs

The EPA DQO process (EPA, August 2000a) will be used to better determine specific data needs for the project, and to establish decision rules for the collection of data to support RI/FS tasks and activities. The DQO process is a planning tool designed to help avoid collecting or otherwise using data that do not contribute to decision-making, better assuring that a sufficient quantity and quality of data are acquired so that informed decisions can be made. The DQOs will ascertain the type, quality, and quantity of data necessary to address media-specific concerns before sampling and analysis begins. The process to be followed for establishing DQOs for the RI include these seven steps:

1. State the problem
2. Identify the decision
3. Identify inputs to the decision
4. Define the study boundaries
5. Develop a decision rule
6. Specify acceptable limits on decision error
7. Optimize the sampling design

Tables will be developed that summarize the DQOs and associated study tasks for each medium and each phase of data collection. The DQO information in these tables will provide the basis and rationale for each phase of RI data collection.

3.1.3 Air

A limited number of air quality evaluations have been conducted within the UCR study area. The necessity of collecting additional air quality data will be determined based on subsequent review of existing information. One area of particular concern with respect to air quality includes the possible human health effects caused by inhalation of fine particles of exposed sediment (containing elevated concentrations of COCs) that can be carried into the atmosphere during dry, windy periods when reservoir water levels are seasonally drawn down. The results from the ongoing USGS air quality study and the need for additional air studies will be assessed.

3.1.4 Soil

A limited amount of information is believed to be available regarding COC concentrations in shallow upland area soils within the study area. Stack emissions from various industrial/mineral processing sites, including historical operations in Northport, Washington and Trail, British Columbia, potentially resulted in the dispersal and deposition of airborne contaminants (metals, sulfur dioxide, etc.) throughout portions of the UCR study area under a variety of meteorological conditions. Contaminants that are distributed via airborne deposition may affect the uppermost layer of the soil column, possibly causing COC concentrations that exceed typical background concentrations and/or potentially applicable cleanup standards. Further complicating the identification of "impacted" upland soils (in particular metals) from ambient background concentrations is the fact that metal ore deposits are known to exist within the study area. For selected COCs, differentiating low-level anthropogenic impacts from natural variations in background concentrations will be assessed.

One area of particular concern includes "beach" areas where slag from the Teck Cominco smelter is known to have been deposited in river floodplain areas (e.g., point bars), presumably during historical high flow events. Slag-impacted beach areas are known to occur within the UCR study area. For purposes of this investigation, the slag-impacted beach sand is considered as "soil" so as to differentiate this material from "exposed sediment," which is the term used to describe sediment in reservoir areas that become dewatered during periods of seasonal drawdown.

The scope of the RI soil investigation program data will be determined based on subsequent review of existing information, as described in Section 2.1.1. It is anticipated that the RI data collection efforts for soil will focus on soil contamination resulting from historical atmospheric deposition, and on beach areas that lie above the normal range of reservoir fluctuations – including areas upstream of the reservoir, and areas within the reservoir.

3.1.5 Groundwater

A limited amount of groundwater quality data is believed to be available for the UCR study area. Although large-scale groundwater quality impacts attributable to previous land uses or historical activities are not documented, additional focused investigation activities may be required to confirm the presence of localized impacts or vulnerable areas. The necessity of collecting additional groundwater quality data will be determined largely by the subsequent review of existing groundwater quality information, as described in Section 2.1.1.

3.1.6 Surface Water

The UCR is and will continue to be a dynamic river/reservoir system. As such, it is not appropriate to assume that one data set best represents the full range of water quality conditions in the river. A combination of data sets that represent different points in time and different locations may best represent the range of conditions that could reasonably be

expected to occur at the site. The U.S. Geological Survey (USGS, 1994) established the following subdivisions as part of their previous investigations:

- North of International Boundary—Canada (Riverine)
- Northport Reach (Riverine)
- Upper Lake Roosevelt Reach (Transitional)
- Middle Lake Roosevelt Reach (Lacustrine)
- Lower Lake Roosevelt Reach (Lacustrine)

It is anticipated that similar subdivisions of the river will be used to differentiate variations in lacustrine and riverine reaches that may affect contaminant fate and transport.

Existing surface water data, including flow and water quality parameters, including contaminant concentrations, will be used (where available) to identify potential areas of concern. The scope of the surface water data collection program will be determined based on subsequent review of existing information (as described in Section 2.1.1) and the outcome of the DQO process. It is anticipated that additional surface water data will be collected to verify whether impairment of the river and tributaries is currently occurring. One approach under consideration is to evaluate surface water quality in the UCR within each of the subdivisions described above, and at the mouth of major tributaries.

In addition to surface water quality, bathymetric information for the reservoir and upstream river section (Northport to international boundary) also will be evaluated as a potential data need for the project. This is discussed further in Section 3.1.7.

3.1.7 Sediment

As indicated in Section 3.1.6, the UCR represents a dynamic river/reservoir system. Natural seasonal changes in river and tributary discharge and dam-related changes in the elevation and size of the reservoir pool affect the hydrodynamics of the river system (i.e., flow velocities and current patterns). This, in turn, affects sediment stability and the development of distinct sediment deposition and erosional areas within the river system. The quantity and location of sediment inputs to the river—both natural and contaminant source-related—also can affect sediment distribution and stability along with other factors such as wind-generated waves, bank slumps, and/or anthropogenic disturbances (e.g., prop wash/boat waves and human use activities in actively used beach areas).

Developing an understanding of sediment sources and the processes that affect sediment transport and deposition is essential for understanding the observed distribution of chemical contaminants in the sediment, and for development of potential remedial options. Identification of net depositional versus erosional areas is expected to require a better understanding of hydrodynamic and sediment transport considerations, along with an understanding of the physical characteristics of the sediment. New bathymetric information may be an important data need for addressing hydrodynamic and sediment transport conditions within the river/reservoir environment. Existing bathymetric information will be evaluated and a determination made regarding the extent to which it can be used, and to what extent new bathymetric information is needed. The need for sophisticated sediment transport modeling will be assessed after evaluating sediment transport using existing bathymetry and standard engineering means.

The approach and rationale for sediment sampling in the UCR will be developed through an evaluation of historical sediment data, and ongoing coordination with project decision-makers, the state, tribes, other federal agencies, and interested parties. Preliminary review of sediment data from previous investigations by the USGS and EPA (USGS, 1994; EPA, March 2003; USGS 2003) indicates that selected chemical constituents are notably enriched in the upper reaches of the river (e.g., international border to Kettle Falls) as compared to concentrations observed in reaches further downstream. Conversely, there are constituents that show less spatially-distinct concentration variations between the international border and Grand Coulee Dam.

Specific details regarding the location and number of sediment samples to be collected, methods of sample collection, and the laboratory analytical requirements will be prepared as specific data needs for sediment are further developed through review of historical data, input from the state, tribes, other federal agencies and interested parties, and DQO development. It is anticipated that sediment samples will be collected using a variety of methods including hand excavation (for exposed sediments), Ponar-type sediment sampling devices, or drilled sediment cores. Suspended sediment samples also may be collected from selected areas to better assess the fate and transport of COCs that are adsorbed or contained in colloidal materials and/or suspendable fine-grained particulates.

As a result of routine dam operations and maintenance activities, it is important to note that "sediment," which is normally considered to be a sub-aqueous medium, may be periodically exposed (dewatered) within near-shore areas as the reservoir pool level is lowered. The potential exposure considerations for submerged versus exposed sediment are notably different. In recognition of this, the term "exposed sediment" will be used when referring to areas or conditions where river sediment has been dewatered.

3.1.8 Biota

Several biological assessment items may be addressed during various phases of the UCR RI/FS to help better understand the biological aspects of the site and support subsequent ecological risk assessment activities. Some potential items that may require additional assessment include:

- Identification of general types of aquatic, avian, and terrestrial wildlife potentially using the UCR
- Identification of special status species (State and Federal)
- General understanding of foodweb structures and predator-prey relationships
- Mapping of general habitat types
- Toxicity testing results (sediment, porewater, and surface water)
- Fish and benthic community structures (abundance and diversity) and life cycles
- For representative indicator species, gather information on foraging habits and home range
- For representative indicator species, gather information on migration times
- Identification of shorebird use areas (based on observation or bathymetry)

Fish sampling will be conducted for assessment of potential human health and terrestrial impacts to support the human health and ecological risk assessments. Anticipated target species for assessment of fish tissue analysis include walleye, rainbow trout, largescale

sucker, and possibly mountain whitefish. Benthic community sampling will be conducted in select areas. Biota sampling other than fish, for example terrestrial and aquatic biota, may be done if evidence supports the potential for bioaccumulation of contaminants.

3.1.9 Prepare Project Plans

Planning documents will be developed in accordance with CERCLA guidance (EPA, 1998) to support specific RI/FS field investigation requirements. Project plans that will be prepared include:

- Sampling and analysis plan (SAP)
- Quality assurance project plan (QAPP)
- Field sampling plan (FSP)
- Investigation-derived waste (IDW) management plan
- Health and safety plan (HSP)

Project planning documents will be modified and updated over the life of the project to support various phases and types of data collection, and ongoing changes in project conditions and requirements. Documentation to support the Section 106 process related to protection of historic properties and cultural resources also will be prepared.

3.1.10 General Field Efforts

A variety of field efforts will be conducted to fill identified data gaps. Several general types of field data collection and planning/preparation activities might be performed, such as:

- Subcontractor procurement
- Mobilization
- Soil sampling
- Surface water sampling
- Groundwater sampling
- Air sampling
- Sediment sampling (surface and cores)
- Bathymetric surveys
- Sediment profiling
- River velocity profiling
- Benthic community sampling or surveys
- Aquatic biota sampling
- Terrestrial biota sampling
- Surveying (e.g. GPS for sample locations)

Prior to execution of field investigation activities, details of the specific data collection approaches, IDW management, and specific quality control (QC) protocols will be delineated in planning documents including screening of proposed sampling locations for potential cultural, historical, and natural resource sensitivities.

3.2 Sample Management, Analysis, and Validation (Task 4)

Task 4 work elements are related to the compilation and management of field and analytical data, the review of data quality, and the determination of data usability. Details regarding sample management, analysis, and validation will be developed in subsequent planning documents.The following information will be presented in these planning documents:

- Sample management
- Field documentation
- Sample documentation
- Sample packaging and shipping
- Analytical procedures and protocols
- Data validation and data usability
- Testing of physical parameters
- Task management and quality control

The data generated during the RI will be entered into a project database. Details regarding chain-of-custody procedures and the data quality evaluation processes will be described in the QAPP and other QC-related documentation.

3.3 Data Evaluation (Task 5)

Task 5 work elements are related to the compilation and evaluation of RI analytical and field data. Data collected during the RI/FS will be evaluated to assess media-specific considerations, in accordance with CERCLA guidance. Evaluation results will include revisions to the CSM, identification of site characteristics, and identification of uncertainties.

Data evaluation includes establishment of data quality and data interpretation. As part of the data evaluation task, technical memoranda documenting and interpreting the findings will be prepared as directed by EPA.

3.3.1 Data Interpretation

Specific processes to be used for interpreting the data will include:

- Preparation of data summaries – data tabulation
- Preparation of graphs, charts, and figures
- Use of GIS data layers
- Statistical evaluation of selected data
- Evaluation of spatial distribution and trends
- Evaluation of temporal distribution and trends
- Comparison to background conditions, where applicable
- Comparison to historical data and results
- Comparison to applicable standards and/or PRGs
- Comparison to CSM for consistency and/or refinement

3.4 Risk Assessment (Task 6)

The overall objective of Task 6 is to determine the nature, magnitude, and probability of actual or potential harm to public health, safety, or welfare, or to the environment posed by the threatened or actual release of hazardous substances in the UCR. The goal of the risk assessment task will be to provide estimates of risk to support remedial decision making , allow informed decisions, and are communicated in an understandable manner. In accordance with CERCLA guidance, risks to public health and the environment are to be characterized under the assumption of no remedial action, also known as the baseline risk assessment.

The purpose of the baseline risk assessment is to facilitate EPA's decision-making by identifying the most important exposure pathways and chemicals that should be reduced or eliminated. A risk assessment evaluates the likelihood of adverse effects occurring in human populations potentially exposed to contaminants released in the environment. Risk assessments are not intended to predict the actual risk for an individual. Rather, they provide upper-bound (i.e., an upper limit on what is possible) and central tendency estimates of risk with an adequate margin of safety, according to EPA guidelines, for the protection of virtually all receptors that may potentially come into contact with contaminants at the site. Risk assessments are needed to determine if current or potential risks are sufficient to warrant CERCLA remedial actions (U.S. Environmental Protection Agency, 1991b).

3.4.1 Risk Assessment Work Plan

The general methods to be used for completing the human health and ecological risk assessments for the UCR site will be described in a Risk Assessment Work Plan. The Risk Assessment Work Plan will contain the elements described in the following subsections.

Introduction

This section will describe the purpose and approach for conducting the risk analyses. The objective of the baseline risk assessment is to determine the nature, magnitude, and probability of actual or potential harm to public health, safety, or welfare, or to the environment, posed by the threatened or actual release of hazardous substances at or from the UCR site in the absence of any further remedial action. The overall vision for the risk assessment is to provide estimates of site risk that realistically reflect actual site conditions, allow informed decisions, and are communicated in an understandable manner.

Identification of Chemicals of Potential Concern for Human Health and the Environment

This section will describe the selection criteria applied to reduce the list of chemicals (i.e., chemicals of potential concern) detected as part of the RI sampling efforts and previous studies to those that are potentially significant for the risk assessment while considering unique aspects of the site which may influence exposure assumptions and subsequent Preliminary Remediation Goal development. For example, the criteria to be considered could include detection frequency, comparison with background information (if available), essential nutrients, etc.

Human Health Risk Assessment

This section will provide a description of the organization of the human health risk assessment (HHRA), including the human health exposure assessment, the toxicity assessment for human health, and the human health risk characterization. It will also list the applicable guidance documents to be used. A preliminary list of potential human health exposure pathways is presented in Section 2.1.3.

Human Health Exposure Assessment

The human health exposure assessment will present a conceptual site exposure model, identify the pathways by which potential human exposures could occur, and describe how the pathways will be evaluated. The exposure assessment will define the magnitude, frequency, and duration of exposure for the populations and pathways selected for quantitative evaluation at central tendency and reasonable maximum exposure (RME) levels. The RME is defined as, "...the highest exposure that is reasonably expected to occur at a site" (U.S. Environmental Protection Agency Office of Solid Waste And Emergency Response, 1989; U.S. Environmental Protection Agency, 1991a). The goal is to quantify risk, based on a high level of exposure to ensure an adequate but reasonable level of protection (U.S. Environmental Protection Agency Office of Solid Waste And Emergency Response, 1989). EPA distinguishes between scenarios that are possible but highly improbable, and those that are more likely to occur within a population, with the latter being favored in risk assessment. The RME estimate is not an upper-bound estimate because it must occur within the realm of reasonable likelihood (U.S. Environmental Protection Agency Office of Solid Waste And Emergency Response, 1989).

The exposure assessment must balance the levels of exposure to ensure an adequate level of protection while remaining reasonable. Uncertainties in the exposure assessment are described along with other uncertainties inherent to conducting a risk assessment to meet the transparency, clarity, consistency, and reasonableness criteria (Browner, 1995; U.S. Environmental Protection Agency, 2000b). It will include:

- Characterization of land use. A brief reiteration of how land uses influence potential for human exposure will be presented.
- Development of a conceptual site exposure model for human health in a diagrammatic format, taking into account the varied uses of the area.
- Computation of exposure point concentrations (EPCs). The process for statistical derivation of EPCs will be described.
- Calculation of intake. Formulas for computation will be provided.

Human Health Toxicity Assessment

The toxicity assessment of human health will summarize how the toxicity of the selected chemicals and the relationship between magnitude of exposure and adverse health effects will be evaluated. It will also identify the sources of toxicity factors to be used.

Human Health Risk Characterization

The human health risk characterization will discuss how information from the toxicity and exposure assessments will be integrated to characterize the risks to human health from potential exposure to chemicals in environmental media. The methods to be used for cancer risk estimation, noncancer hazard estimation, and risk from exposure to lead will be described.

Ecological Risk Assessment

This section will provide a description of the organization of the ERA, and will list the guidance documents to be used for completion of the ERA.

The Tiered Approach for the Ecological Risk Assessment

The ERA will be phased so that each subsequent phase (if necessary) will rely on the findings of the prior phase. This tiered approach is structured to avoid unnecessary tasks and to focus the investigation on areas where potential ecological impact might be expected.

Problem Formulation

The problem formulation subsection of the ERA will provide the methods for identifying the environmental attributes to be protected at and near the UCR site, as well as the stressors that could affect these attributes. It will also describe the process for selecting assessment and measurement endpoints used to estimate the health of the site's ecosystems. Components of problem formulation will include:

- Identification of stressor characteristics. A list of the chemicals detected in environmental media at the site will be provided.
- Identification of ecosystems potentially at risk, including habitat identification and receptor identification.
- Selection of ecological endpoints.
- Selection of indicator species.

Ecological Exposure Assessment

The ecological exposure assessment will present the preliminary conceptual site exposure model for ecological receptors and will describe the methods for conducting the exposure assessment. The ecological exposure assessment will assess a variety of exposure pathways. Components of this assessment will include:

- Development of a conceptual site exposure model for ecological receptors
- Identification of measures of exposure to terrestrial/avian wildlife, including intake equations for foodweb modeling
- Identification of measures of exposure to aquatic and benthic receptors
- Identification of measures of exposure to vegetation

Identification of the Potential for Ecological Effects

This subsection will discuss the process for establishing ecological effects using literature reviews and/or field studies. These will include:

- Identification of literature-derived critical toxicity values; that is, toxicological databases
- Field survey measurements; that is, biological surveys, tissue residue analyses
- Direct measurement of toxicity and chemical bioavailability using standard toxicity bioassay test methods

Ecological Risk Characterization

This subsection will describe the process for determining the adverse effects of contaminants under existing conditions and exposures, assuming there is no further remedial action. The uncertainties and limitations of the assessment will be discussed. The ecological risk characterization section will describe the following:

- Use of multiple lines of evidence
- Derivation of ecological quotients
- Weight-of-evidence approach
- Determination of ecological significance

Uncertainty Analyses

Uncertainties and limitations are inherent in the human and ecological risk assessment processes. The uncertainties and limitations encountered during the completion of the final HHRA and ERA will be identified and characterized as to their overall effects on the conclusions (e.g., could result in an over- or under-estimation of the potential risks) where possible.

3.4.2 Baseline Risk Assessment Report

A risk assessment report will be prepared that includes the assessment methods, assumptions, and findings from both the HHRA and ERA.

3.5 Treatability Studies (Task 7)

Treatability studies are conducted primarily to provide sufficient data to allow remedial alternatives to be fully developed and evaluated during the FS, and to support the remedial design of a selected alternative and/or to reduce cost and performance uncertainties to acceptable levels so that a remedy can be selected. An early assessment of treatability testing needs will be conducted during Task 1 following identification of preliminary RAAs. Subsequent treatability testing needs will be periodically assessed following data evaluation (see Figure 3).

Examples of potential treatability study needs include:

- Provide information to help assess the relative costs and efficiencies of sediment removal or containment options

- Evaluate sediment to determine if physical separation techniques such as gravity separation, magnetic separation, or size classification may be used to reduce the volume of removed sediment
- Assess the need for subsequent treatment or disposal requirements for removed sediments.

Once a treatability study need is identified, individual treatability study work plans will be developed that will specify the purpose, objectives, methodologies, data management, and data interpretation procedures to be used for the subsequent bench- or pilot-scale study.

3.6 RI Reports (Task 8)

An RI report will be completed in accordance with the suggested format outlined in the EPA RI/FS guidance document. Prior to preparation of the RI report, interim deliverables and technical memoranda will document project findings, and may be included in an appendix of the RI report. A preliminary outline of the RI report is as follows:

Executive Summary

Section 1 Introduction-includes description of the purpose of the report, summary of site background, and report organization

Section 2 Study Area Investigation-includes description of field activities, summary of site characterization that may include surface features, contaminant source investigations, meteorological investigations, surface water and sediment investigations, geological investigations, soil investigations, groundwater investigations, air investigations, population surveys, and ecological investigations

Section 3 Physical Characteristics of the Study Area-includes results of field investigations that may have included surface features, meteorology, surface water, geology, soils, hydrogeology, demography, land use, and ecology

Section 4 Nature and Extent of Contamination-presents the results of site characterization for site sources, soils, groundwater, surface water, sediments, and air

Section 5 Contaminant Fate and Transport-details potential routes of migration; describes persistence of chemicals and physical, chemical, and/or biological factors of importance; discusses factors affecting contaminant migration, including modeling results (if applicable)

Section 6 Baseline Risk Assessment-includes human health and ecological evaluations

Section 7 Summary and Conclusions-summarizes the nature and extent of contamination, fate and transport, and risk assessment; provides conclusions concerning data limitations and recommendations for future work, and recommends RAOs

Section 8 References

Appendices-may include technical memoranda for field activities or data assessments, analytical data, quality assurance/quality control (QA/QC) evaluations, risk assessment methods

SECTION 4

Feasibility Study

The purpose of the FS process is to develop, screen, and evaluate remedial alternatives to support the final selection of a cleanup action (or series of actions) for the UCR site. The FS process will consider several factors, including:

- Level of site understanding based on the RI, and other pertinent investigations and studies
- Compliance with ARARs
- Risk assessment findings
- Management goals and priorities
- The degree to which source control measures, and natural environmental processes, will limit ongoing flux of source-related contaminants into the UCR
- Lake Roosevelt management priorities
- Effectiveness, implementability, and cost of remedial alternatives

4.1 Development and Screening of Remedial Alternatives (Task 9)

Remedial alternatives will be identified and screened in accordance with CERCLA guidance. Development of preliminary RAOs and preliminary RAAs is done in Task 1. These will be modified as the RI/FS process proceeds, and will provide the basis for development of final remedial alternatives. These alternatives will be carried through the screening and evaluation process. EPA's preferred alternative will be presented to the public in a proposed plan for the UCR site. Following receipt and consideration of public comments, the EPA will issue a site ROD that will present and describe the site remedy.

The alternative development and screening process consists of the following steps:

- Development of RAOs.
- Identification of General Response Actions
- Identification of potential treatment, resource recovery, and containment technologies that will satisfy the RAOs.
- Screening the technologies based on their implementability, effectiveness, and cost.
- Assembling technologies and their associated requirements into alternatives for the contaminated media at the site or for the operable unit.

- Screening out certain options, as needed, to reduce the number of alternatives that will be analyzed in detail to minimize the resources dedicated to evaluating options that are less promising. This screening will be conducted based on short- and long-term aspects of effectiveness, implementability, and cost criteria.

Alternatives can be developed to address contaminated media (e.g., sediment), a specific area of the site (e.g., the Northport Reach, contaminated hot spots, or operable units), or the entire site. Alternatives for specific media and site areas can either be carried through the FS process separately, or combined into comprehensive alternatives for the entire site. The approach is flexible to allow alternatives to be combined at various points in the process. It is also important to note that comparisons during the alternative screening are usually made between similar alternatives, whereas comparisons during the detailed analysis will differentiate across the entire range of alternatives.

4.2 Detailed Analysis of Alternatives (Task 10)

A detailed analysis of remedial alternatives will be conducted. The detailed analysis is the methodology by which the alternatives are evaluated, and provides the basis for the selection of the preferred alternative by EPA with input from the state and the public. However, the FS does not recommend the preferred alternative, it just presents the relevant information needed to make the decision.

The alternatives are evaluated against nine criteria that the EPA has developed to address the statutory requirements and preferences of CERCLA. These criteria are classified as "threshold" criteria, "balancing" criteria, and "modifying" criteria. The threshold criteria must be met by the alternatives. These criteria are overall protection of human health and the environment, and compliance with ARARs. The balancing criteria are the five primary criteria upon which the alternatives are compared: long-term effectiveness and permanence; reduction of toxicity, mobility, and volume; short-term effectiveness; implementability; and cost. The modifying criteria are evaluated following comment on the RI/FS report and the proposed plan. These criteria are state or support agency acceptance, and community acceptance.

The alternatives are analyzed individually against each criterion and then compared against one another to determine their respective strengths and weaknesses and to identify the key tradeoffs that must be balanced for that site. The results of the detailed analysis are summarized in the FS report and presented to the decision-maker so that an appropriate remedy consistent with CERCLA can be selected.

4.3 Feasibility Study Report (Task 11)

The FS report will document the development and detailed analysis of the remedial alternatives for the UCR site. The report will also document additional site characterization information resulting from the continued evaluation of historical data and the collection of new data during field efforts not documented in the RI report.

The following is a preliminary outline:

- **Section 1 Introduction** (FS purpose and overview, site background information, nature and extent of contamination, fate and transport of contamination, and risk assessment)
- **Section 2 Development of Preliminary Cleanup Goals** (RAOs and ARARS)
- **Section 3 Identification and Screening of Remedial Technologies**
- **Section 4 Assembly, Screening, and Development of Remedial Alternatives**
- **Section 5 Detailed Analysis of Remedial Alternatives**
- **Section 6 References**
- **Appendices** (supporting information)

SECTION 5

Project Management

The activities described in this scoping plan will be conducted on EPA's behalf by CH2M HILL under AES Contract Number 68-S7-04-01. CH2M HILL will be assisted by Ecology and Environment, Inc. (E & E) and other subcontractors. EPA will work with the public, the state, tribes, other federal agencies, and interested parties to learn about their ideas and concerns, discuss work already accomplished, and coordinate future work. This information will be considered in EPA's planning of field efforts, in establishing exposure scenarios for use in the risk assessment, and in identifying, screening, and evaluating remedial alternatives in the FS process. The EPA Remedial Project Managers (RPMs) will be the focal point for communications among the state, tribes, other federal agencies, interested parties, and the public.

5.1 Staffing

CH2M HILL project staff and subcontractors will work as a team under EPA's direction. Table 1 provides a summary of key EPA and contractor staff, including contact information.

TABLE 1
Upper Columbia River Site Key Project Staff

Organization and Name	Role	Location and Contact Information
EPA Region 10		
Kevin Rochlin	Remedial Project Manager (RPM)	Seattle (206) 553-2106 rochlin.kevin@epa.gov
Sally Thomas	Remedial Project Manager (RPM)	Seattle (206) 553-2102 thomas.sally@epa.gov
Monica Tonel	Program Support	Seattle (206) 553-0323 tonel.monica@epa.gov
Bruce Duncan	Ecological Risk Assessor	Seattle (206) 553-0218 duncan.bruce@epa.gov
Marc Stifelman	Human Health Risk Assessor	Seattle (206) 553-6979 stifelman.marc@epa.gov
Deborah Neal	Community Involvement Coordinator	Seattle (206) 553-0115

TABLE 1
Upper Columbia River Site Key Project Staff

Organization and Name	Role	Location and Contact Information
		neal.deborah@epa.gov
CH2M HILL		
Jim Stefanoff	Site Manager (SM)	Spokane (509) 747-2000 jstefano@ch2m.com
Chuck Gruenenfelder	Remedial Investigation Lead	Spokane (509) 747-2000 cgruenen@ch2m.com
John Childs	Feasibility Study Lead	Portland (503) 235-5000 jchilds@ch2m.com
Dennis Shelton	Risk Assessment Lead	Corvallis (541) 752-4271 dshelton@ch2m.com
Jim Mavis	Senior Review	Bellevue (425) 453-5000 jmavis@ch2m.com
Dave Bunte	Senior Review	Redding (530) 243-5831 dbunte@ch2m.com
E & E		
Mark Longtine	Task Lead	Seattle (206) 624-9537 mlongtine@ene.com

5.2 Coordination

The EPA RPMs, Kevin Rochlin and Sally Thomas, have the primary responsibility for directing the technical scope of work, coordinating with other government agencies, the state, the tribes, interested parties, and the public, and managing the overall project schedule and budget. CH2M HILL's Site Manager (SM), Jim Stefanoff, has the primary responsibility for coordinating the contractor team and managing the contractor schedule and budget.

Regularly scheduled team meetings or conference calls will occur to enhance coordination between EPA, CH2M HILL, and E & E. These will be attended by key technical staff as needed to address specific issues. CH2M HILL will also provide subcontracting services to EPA in support of the RI/FS.

5.3 Schedule

The RI/FS will be conducted over a multi-year period. Table 2 presents the anticipated work schedule through 2005. Work schedules will be prepared and updated periodically as the work progresses. The first phase of field investigation and sample collection is expected to occur in the spring of 2005.

TABLE 2
Anticipated Work Schedule Through 2005

Task	Anticipated Schedule
Task 1—Project Planning	April 2004 - November 2004
Task 2—Community Involvement	April 2004 – December 2005
Task 3—Field Investigation/Data Acquisition	
Phase 1 DQO process and project plans	September 2004 – March 2005
Anticipated Phase 1 field investigation activities for 2005 include: • Sediment Sampling • Sediment Toxicity Testing • Beach Sampling • Fish Sampling • Habitat Delineation (Aquatic and Upland) • Bathymetric Assessments	April 2005 – October 2005
Task 4—Sample Management, Analysis, and Validation (Phase 1 Data)	April 2005 – December 2005
Task 5—Data Evaluation (Historic and Phase 1 Data)	November 2004 – December 2005
Task 6—Risk Assessment (Historic and Phase 1 Data)	November 2004 – December 2005
Task 7—Treatability Studies (Phase 1)	May 2005 – October 2005
Task 8—RI Reports (Phase 1 Reports)	May 2005 – December 2005
Task 9—Development and Screening of Remedial Alternatives (Phase 1)	September 2005 – December 2005
Task 10—Detailed Analysis of Alternatives	No activity expected through 2005
Task 11—Feasibility Study Report	No activity expected through 2005

SECTION 6

References

This section lists references cited within the RI/FS scoping plan.

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